

Bolster e-Learning Using Enterprise Application Simulations

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Contact Us

Americas: + 1 (678) 277 3210

UK, Europe, and Middle East: +44 (0) 118 921 2070

Africa, Australasia and Asia Pacific: +27 (0) 21 799 4230

www.stt-trainer.com

In an article published by “**The e-Learning Developers Journal**”, Randall Kindley provided an in-depth review of what he called the “**SIMBEL**” phenomenon – **SIM**ulation-Based E Learning.

Since the article covers the full spectrum of Simulation as it relates to E-Learning, I have summarised this in order to provide a perspective against which to consider **software simulation tools** such as STT Trainer.

I thank Randall for his permission to summarise his original work in this way. A link to the original article is provided below.

I'd also like to acknowledge the contribution of Robert Taal (Managing Director) of Quartet Solutions [Note: Quartet Solutions is now part of [Insite Objects, Inc.](#)] who as an STT Trainer Partner were pleased to provide feedback and suggestions during the creation of this article.

Nigel Warren

Product Specialist

Kaplan IT Learning

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What is simulation-based e-Learning?

A simple definition of simulation-based e-learning is “learning by doing”. Simulations enable experience based “learning moments”, usually by allowing learners to fail ... but to fail safely.

How do simulations relate to traditional e-Learning?

Many training managers are complaining of “Teflon™ training” – the kind of training which does not stick – with little content transferred from the e-Learning programme to changes in behaviour or performance. Many training managers are seeing low completion rates for expensive e-Learning titles which they have already bought. Perhaps this indicates low satisfaction amongst users of typical asynchronous e-Learning, which, due to the boring nature of the types of presentation and recall assessment, is now commonly referred to as “page-turner” training.

By contrast to “page-turner” style e-learning, simulations have the potential to offer dynamic, moving learning events in which the user is much more immersed. The user is required to actually perform a job and to experience the results just like in a live environment. As a general rule, effective simulations provide a variety of possible paths to achieving the desired goal. Simulations seek to create a pseudo reality – which should mimic the real work environment. As a consequence, simulations enable “learning by doing” by focusing on the learner’s performance outcomes, rather than theoretical knowledge.

Characteristics of effective simulations

Good simulations imitate **reality**, but do not have to be perfect replications of it. Instead, they replicate the work environment in most of the important details – they create a situation in which the participant can “live” the situation, without experiencing counterproductive stress or causing undue harm. This concept is very familiar to flight simulators.

Great simulations should have three additional structural components:

- A well-developed work flow or **storyline**
- Careful staging pushing the learner to **failure**
- A **simulation mentor** for the learner

The idea of “**Failure Staging**” is perhaps surprising. Learning moments (a term coined by www.indeliq.com) occur when the learner is confronted with failure or potential failure. Failure staging assists the learner, at many levels – including the psychological level: – The potential for failure often dramatically increases a learner’s mental activity and attention. At the same time, failure must be treated carefully as it can demoralise the learner. Consequently, the following guidelines are recommended for failure staging:

- Make mistakes recoverable, avoiding the message that failure is absolute.
- Make sure that failure is not overly contrived – as this would undermine the realism of the training.

- Make semi-contrived failures occur early in the course, so that users become accustomed to the boundaries of the simulation.
- Build stages into the course, so that different learners are likely to fail at different points as a result of their interactions and choices in the simulation, otherwise everyone will fail at the same point and render results less valuable.

The concept of a “**Simulation Mentor**” is also valuable. Comparisons can be drawn from your experience in school. Your favourite teacher was no doubt someone who showed empathy and helped with your work, rather than someone who just graded your work. In the same way, the best simulations will (albeit artificially) show some empathy and provide help. It should have the capacity to provide not just instructions, but advice and help as well as immediate feedback on progress. In effect, the simulation mentor is the interface through which instructions, help and feedback are provided. Here are some further important attributes of the mentor.

- “**Context-based help on steroids**” – This resembles the MS-Office assistant, but is far less annoying. It should be more conversational and helpful, and provides real-time feedback as the learner progresses. It prompts the learner to act, provide suggestions for alternatives, and offers useful information on demand. Thus, it provides an alternative to the crude “shovel-ware” approach of many traditional e-learning tools.
- “**Life-like engagement**” – Some protagonists argue for the mentor to be a character with human characteristics – someone with whom the learner can readily form a bond. Some dramatic presence may be a key success factor.
- **Support for “Scaffolding and Fading”** – These rather strange terms refer to the support provided to the learner during the simulation (scaffolding) and the gradual reduction of this as the simulation progresses and the learner become more self sufficient. The mentor should be capable of working like this – initially frequent and content rich support which fades out over the duration of the simulation.

The spectrum of simulations

Simulations are not all alike. They can range from simple to extremely robust, virtual reality or game-like mediums. Here are some examples which illustrate the wide spectrum available:

- Activity Simulations – These focus on job activities. Titles like “How to operate xxx machine...”, etc.
- Soft Skills –Sales training, customer service, coaching skills, etc.
- Process Simulations – Typically require and use models of the process. A title such as “How does an oil refinery work” or “Plant Safety” are examples.
- Business Simulations – Often examine business issues through a “What-if scenario”. Titles such as “Creating Competitive Advantage” and “Evaluating Market Opportunities” are examples.
- Software Simulations – A common subject matter for simulation training since the subject matter is so amenable to this approach. Examples include transactional training for ERP implementations.

- Product Simulations – Typically review a particular product which familiarise the learner with its components and functions.
- Diagnostic Simulations – Typically include problem finding, trouble shooting and other diagnostic situations. Suitable for engineering and safety situations where equipment failure and its identification and remedy are crucial. Diagnostic branching models may buttress the simulation.

Simulations suit a blended learning approach

No single training medium will be a panacea. One of the most important aspects of simulations is their closeness to reality. Since this may be a limitation, it is not surprising that some of the greatest successes for the simulation approach have been when it is used in combination with more traditional instructional methods, which is known as “blended learning”. Such a blended approach includes facilitated group training (perhaps classroom based) that encourages learners to apply and refine the skills they have acquired from self study e-Learning, including simulations. Such an approach has been shown to actually deliver higher performance improvements than a purely instructor led approach. It can also lead to significant cost savings due to shorter classroom durations and a reduction in associated travel and accommodations costs.

Summary

Simulation-based e-learning holds the promise of causing learning to “stick”. It supports users in moving seamlessly from learning-by-doing to performing in the job. But successful simulations should have the following characteristics:

- They should be **immersive** and engender a sense of **reality**.
- They should demand **real-time** behavior, reaction and feedback.
- They should be based around an **effective storyline** or **work flow**.
- They should make judicious use of **staging to failure**.
- They should have an **effective mentor**, supporting **scaffolding** and **fading**.

Reference

The above text is a summary of a more detailed article written by Randall Kindley first published in “**The e-Learning Developers Journal**”. It is reproduced by permission.

Article commentary in relation to STT Trainer

The above article is relevant to all forms of simulation in e-Learning, rather than Software simulation specifically. It provides interesting insights which can be used to compare and contrast various software simulation tools such as STT Trainer.

Here follow some excerpts from Randall Kindley's report. We have chosen those excerpts which we believe are relevant when comparing STT Trainer to other simulation tools focused on software simulations for application end-user training:

Learning by Doing

Many of the simulation tools currently on the market – particularly those that run entirely within a web-browser – are more akin to “ScreenCam on steroids” rather than offering an engaging and demanding learning environment. STT Trainer is acknowledged to offer the most complete and compelling simulation of SAP transactions, enabling realistic screen navigation, and interactive controls. This article goes a long way to illustrating that this is a fundamentally important characteristic of effective simulation training, rather than being a cosmetic consideration.

Allowing you to fail...but fail safely

Training on the productive system is not an option – you can't have users creating orders and invoices on the live ERP system! The traditional alternative was a copy of the real system, populated with dummy data. (A “training client” in SAP-speak.) One of the beauties of the simulated approach to software training, is the escape from needing a real system, with reliable data, and all that this entails – such as data refresh and multiple sets of student exercise data. These are complex and costly overheads when dealing with ERP training – something which can be overlooked by the uninitiated when planning their approach to ERP end-user training. So the simulated approach offers safety in many respects:

- Live systems are not disrupted by training activities
- Simulations always work – whereas training data can get corrupted during exercises when students take the wrong option.
- Simulations provide a self service learning environment – encouraging users to try it for themselves rather than being reliant on a trainer's support.
- Learners are less prone to get into unrecoverable problems when the training system goes wrong, or they make a mistake.

Teflon® training and asynchronous “page-turner” training

It's refreshing to hear what people are now saying about the ineffectiveness of many early e-learning endeavors. Much of the traditional content which is out there is frankly – boring. In comparison to this – simulations have a challenge – to offer something more compelling, more interesting and more effective than Page-turner training. Alas, many of the light-weight simulation tools already on the market – have really only brought the constraints and shortcomings of page-turner training to a slightly different medium. Many simulations have an almost self playing interface – with patronising single step by step instructions, which neither challenge nor motivate the learner. They offer little opportunity to make mistakes, and are predominantly linear in their screen sequencing. In comparison to these, STT Trainer's simulation environment is more realistic, more demanding and provides greater stimulus for the learner. (Teflon® is a registered trademark of DuPont.)

Low completion rates

Knowing who has successfully completed which lessons and who has failed, may be critical to the success of a system deployment. STT Trainer provides the most detailed statistics available for a tool of this kind. It enables line managers to track the progress of their teams and individual learners – towards achieving required training objectives.

Effective simulations will provide a variety of possible paths to achieving the desired goal

STT supports multiple correct paths to completing screens and steps. Fields can be completed in a variety of orders. Most simulation tools are strictly linear. STT supports multiple means of accomplishing a step – for example – <Click and command> or <Double Click>. Many alternative simulation tools offer one interaction method only when in the real system multiple methods might apply.

Simulations need a well developed working model or storyline

In the world of SAP training – this story line is usually imposed by the transaction. For example - the objective of the exercise might be to “Create a Purchase Order – for material x from supplier Y.” Never-the-less, it can still be helpful to do more in the manner of scene setting. What is the scenario in which this transaction is carried out? What dependencies have to already be in place for the transaction to apply? What happened next? Who is affected by the data entry you perform? All of this sort of “context” should be established in relation to the simulation for the storyline to be lifelike and for the training to be educational as well as functional.

Authors should consider whether the simulation environment offers the most appropriate medium to put across these issues – or whether the simulation is just a “learning object” in a larger course? STT Trainer offers much flexibility in this regard. Using template screens it is easy to quickly encompass informational content ahead of the simulation. The instructor window allows you to include concepts for each screen ahead of the interactions the user has to carry out. This is a compelling and effective instructional design – which most other simulation tools fall short of.

Simulations need *staging* which pushes the learner to *failure*

STT Trainer provides a staged approach to failure in the following respects:

- Individual steps such as field data entry are marked correct or incorrect as they are carried out.
- Screens are assessed for completeness before the training moves to a subsequent screen.
- Users have a pre-determined number of “lives” – in which to complete each screen. If they exceed this number (typically 3) the screen is failed.
- Error messages in relation to incorrect actions or incorrect data – come from a rich template – but can be enhanced for individual controls and screens on a case by case basis.
- Lesson Pass / Fail takes into account whether all the screens were completed successfully, as well as a minimum pass mark in relation to mistakes made on screens which were completed.

By comparison, most light weight simulation tools offer little or no meaningful evaluation concept. Instructions are in a linear and single step format – rendering it almost impossible to make a mistake. As a consequence, one is unable to assess whether the training was understood! As one customer described their inferior simulation tool; **“We call it the blue box machine. Why? Because all it does is teach our users to click in a blue box!”**

Simulations need a *mentor* for the learner which should have *scaffolding* and *fading* capability

For STT Trainer the Mentor is the instruction Window, in combination with the error messages generated within the simulation screen. The STT instruction window offers a number of powerful facilities:

- Concepts for screens are displayed before users are required to carry out steps. (“**Scaffolding**”).
- In training mode steps are assessed individually in real-time and progress is marked (tick or cross) for each required interaction – such as data in field or button click, etc. (“**Scaffolding**”).
- In Test mode steps are assessed collectively at the end of a screen, then error messages handled individually. Real-time progress marking is turned-off. (An example of “**fading**”)
- The instructions are presented in such a fashion that the learner has to correlate an instruction with the required screen control. This is more demanding than simple text bubbles pointing at the control directly. While more demanding, it is more “sticky”. The alternative is akin to the Teflon™ style of training referred to in the above article.
- The Point-to-Control supports the learner during training. (“**Scaffolding**”). This is normally turned off during test mode (Another example of “**fading**”)
- Instructions in test mode – can be written in such a manner to perform assessment rather than spoon feeding the answer. (Another example of “**fading**”).
- Concepts can be omitted or re-worded for Test Mode. (Another example of “**fading**”).

Good simulations are like *reality*, but do not have to be perfect replications of it

No simulation tool can do everything. Some software features can be difficult and time consuming to author in a fully realistic manner. In these circumstances, instructional designers should keep in mind the objective of the lesson, and determine whether an alternative method can be used within the simulation to get the required point across. A capacity for lateral thinking is a prerequisite for producing simulation content economically. With STT Trainer there are a wide number of alternative strategies which can be employed in these circumstances. The authoring environment is powerful, and will take a little longer to learn how to use effectively in all situations, but better to have the power and flexibility than to produce patronising “ScreenCam’s on steroids”.

Blended learning approach

Indeed – no training technology should be seen as a panacea. We advocate a blended approach. ERP implementations often involve a great deal of change for the users. Such change management issues cannot be casually thrown in the direction of an e-learning solution – the end-users would revolt! So while we would anticipate change management issues to be addressed through traditional instructor led training – e-learning has a huge part to play in creating a sustainable and affordable long term user support and training solution. E-learning content can serve as an effective ice breaker, creating confident awareness and goodwill. During classroom sessions, simulations can make interactions more meaningful and effective. After instructor led sessions, simulations can function as a long-term self-service training and refresher programme.

Over and beyond this, interested parties need to consider the longer term view. Corporations might be implementing one ERP solution today. In a year or two's time they may be upgrading it, or implementing an additional application. New software versions, new front ends, enhancements and web access will be added, trained staff will leave and new staff will join. In these circumstances a traditional instructor-led approach is expensive, untimely and often ineffective. Where change management is no longer an issue, a professional simulation-based approach to e-learning will typically achieve high end-user competency at a dramatically lower cost than traditional training.

Some readers might also want to consider whether their responsibilities for training now transcend the supply chain? Do customers or suppliers need to interact with your business systems across the web – perhaps via a Portal? How then will you train them? An e-learning approach may be the only sensible answer.